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Synthesis of Analogs of Juvenile Hormons Proceeding from Phenol Derivatives

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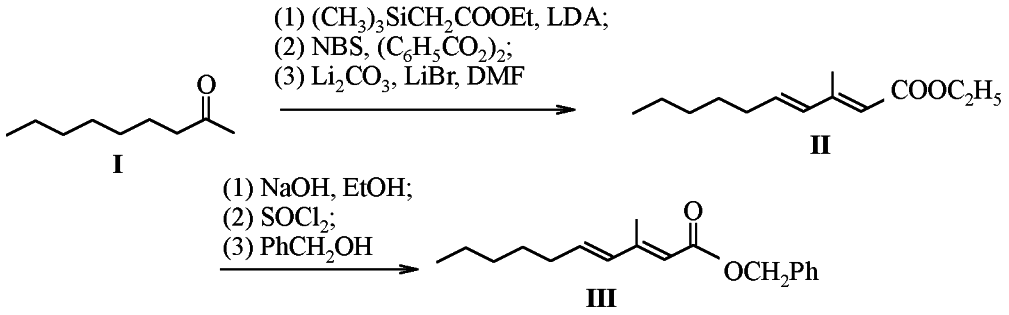
Abstract—New potential juvenoids, esters of alkenoic and alkadienoic acids with phenoxy- and phenoxyphenoxyethanol were synthesized, and also esters of phenoxyacetic acid with alkenols amd alkadienols.

Among the analogs of juvenile hormones attract the attention alkyl, alkoxy or aryloxyaralkyl esters possessing high biological activity [1–3]. On the other hand against the pests are commonly used juvenoids, derivatives of alkenoic and alkadienoic acids [4, 5]. We expected that combination of both these functions in a single molecule would favor its juvenoid activity. This suggestion seems the more probable for the replacement of the ethoxy group in ethyl 2*E*,4*E*-decadienoate (**II**) [obtained by olefination of nonan-2-one (**I**) followed by bromination-dehydrobromination] by benzyloxy group (compound **III**) results in fivefold increase in the juvenoid activity toward meal worm (Tenebrio molitor).



Here we report on the synthesis of aryl and alkenyl esters based on phenoxyethanol **IV–X** and on phenoxyacetic acid **XI–XVIII**. Compounds **IV–X** were prepared by reduction of ethyl esters of substituted phenoxyacetic acids **XIX–XXV** or by reaction between ethylene chlorohydrin with the appropriate phenols **XXVI–XXVIII** in dimethyl sulfoxide in the presence of K_2CO_3. Along this procedure were obtained chloro and nitro derivatives of phenoxyethanol **V, VI, X**. However we failed to obtain in similar way dimethyl **IX** and phenoxy-substituted **VII, VIII** derivatives.

The treatment of the phenoxyethanols **IV–X** obtained with 10-undecenoyl, 3-methyl-2,4-decadienoyl, and 2,4-dichlorophenoxyacetyl chlorides afforded esters of phenoxyethanol **XXIX–LVI**, potential juvenoids (see Scheme 1).

Compounds containing alkene and alkadiene substituents in the alcohol rest of the ester with an aromatic ring in the molecule were prepared by treating arylsubstituted derivatives of phenoxyacetyl chloride **LVII–LXIV** with 3,7-dimethyl-2,6-octadienol or 3-methyl-2,4-decadienol. The initial phenoxyacetic acids were prepared by a known procedure [6–8] from phenols **XXVII, XXVIII, LXV–LXX** and chloroacetic acid.

Compounds containing alkene and alkadiene substituents in the alcohol rest of the ester with an

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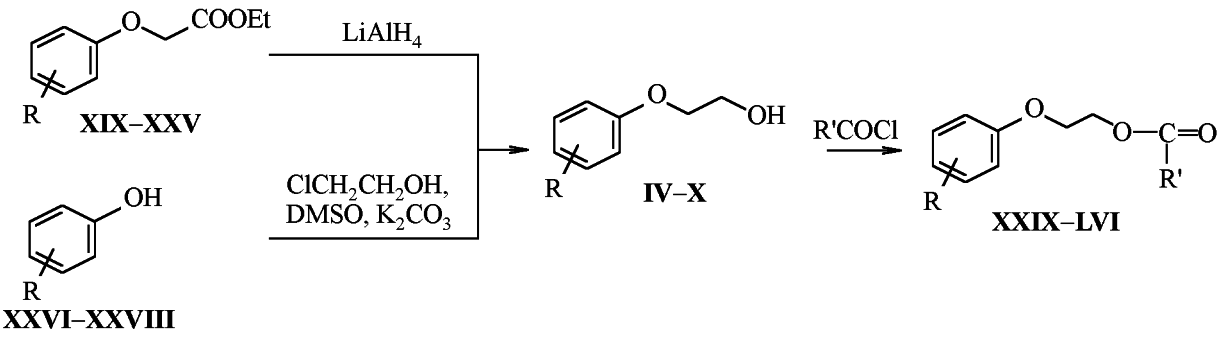
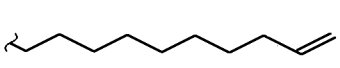
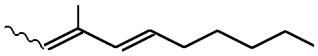
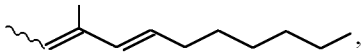
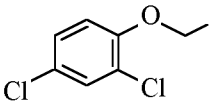
Scheme 1.



R = H (**IV, XIX, XXIX, XXXVI, XLIII, L**), 4-Cl (**V, XX, XXVI, XXX, XXXVII, XLIV, LI**), 4-NO_2 (**VI, XXI, XXVII, XXXI, XXXVIII, XLV, LII**), 3-OC_6H_5 (**VII, XXII, XXXII, XXXIX, XLVI, LIII**), 4-OC_6H_5 (**VIII, XXIII, XXXIII, XL, XLVII, LIV**), 2,3-$(CH_3)_2$ (**IX, XXIV, XXXIV, XLI, XLVIII, LV**), 2,4-Cl_2 (**X, XXV, XXVIII, XXXV, XLII, XLIX, LVI**);

R' =  (**XXIX–XXV**),  (**XXXVI–XLII**),

XLIII–XLIX **L–LVI**

aromatic ring in the molecule were prepared by treating arylsubstituted derivatives of phenoxyacetyl chloride **LVII–LXIV** with 3,7-dimethyl-2,6-octadienol or 3-methyl-2,4-decadienol. The initial phenoxyacetic acids were prepared by a known procedure [6–8] from phenols **XXVII**, **XXVIII**, **LXV–LXX** and chloroacetic acid.

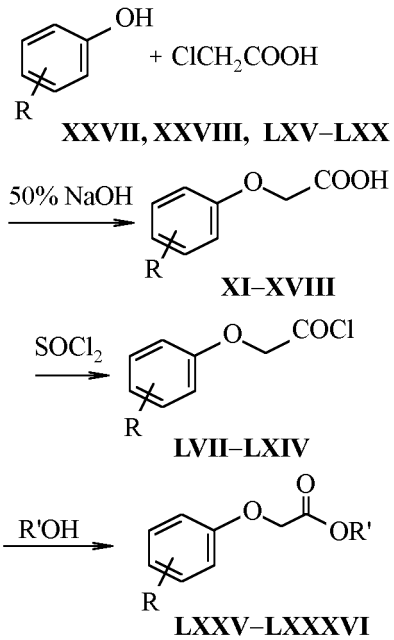
EXPERIMENTAL

IR spectra were recorded on spectrometer UR-20 from thin film, ^1H and ^{13}C NMR spectra were run on spectrometer Bruker AM-300 (operating frequencies 300 and 75 MHz respectively) from solutions in $CDCl_3$ relative to TMS. GLC was carried out on chromatograph Chrom-5, column 1200×4 mm, stationary phase 5% SE-30 on Chromaton N-AW-DMCS, oven temperature programmed for 50–300°C at a rate 1 deg min^{-1}, carrier gas helium.

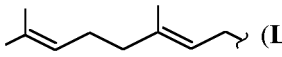
Alcohols IV–X. (a) To a solution of an appropriate ester **XIX–XXV** (5 mmol) in anhydrous ethyl ether (15 ml) was added by portions at 0°C $LiAlH_4$ (5 mmol), and stirring at 0°C was continued for 1 h. The reaction mixture was warmed to room temperature, stirred for 1 h more, and then was carefully added water (0.4 ml). The mixture was stirred for 2h, the precipitate was filtered off and washed with ether on the filter (40 ml). The combined organic solutions were washed with saturated NaCl solution, dried with $MgSO_4$, filtered, and evaporated. The yield of the corresponding alcohol **IV–X** was 85–90%. The alcohols were used in further syntheses of compounds **XXIX–LVI** without purification. IR spectrum (ν, cm^{-1}): 3200–3450 br.s.

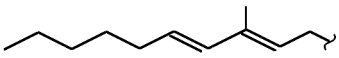
(b) To a solution of an appropriate ester **XIX, XII–XXIV** (5 mmol) in the anhydrous ethyl ether (20 ml) was added at 0°C under argon dropwise 73% solution of $(i\text{-Bu})_2AlH$ in hexane (1.43 ml) diluted preliminary with anhydrous ethyl ether (5 ml). The stirring at 0°C was continued for 1 h, then the reaction mixture was warmed to room temperature and left standing for 12 h. Then 0.5 ml of water was added at stirring, the stirring was continued for 3 h, the precipitate was filtered off and carefully washed on the filter with ethyl ether. The combined organic extracts were washed and treated as in the run *a*. We obtained 90–95% of the corresponding alcohol **IV, VII–IX**. (c) A solution of an appropriate phenol **XXVI–XXVIII** (6.2 mmol), ethylene chlorohydrin (7.3 mmol), and K_2CO_3 (9.2 mmol) was stirred at 60°C for 6 h. The reaction mixture was poured into water (30 ml), the reaction products were extracted into ethyl ether. The extract was washed with 1 N solution of NaOH, with water, and dried on $MgSO_4$. The solvent was distilled off, and as the residue we obtained the corresponding phenoxyethanol **V, VI, X** in 80–84% yield.

Scheme 2.



R = 2-NO_2 (**XI, LVII, LXV, LXXI, LXXIX**), 4-NO_2 (**XII, XXVII, LVIII, LXXII, LXXX**), 2,3-$(CH_3)_2$ (**XIII, LIX, LXVI, LXXIII, LXXXI**), 2,6-$(CH_3)_2$ (**XIV, LX, LXVII, LXXIV, LXXXII**), 2,5-$(NO_2)_2$ (**XV, LXI, LXVIII, LXXV, LXXXIII**), 3,4-$(NO_2)_2$ (**XVI, LXII, LXIX, LXXVI, LXXXIV**), 2,3-Cl_2 (**XVII, LXIII, LXX, LXXVII, LXXXV**), 2,4-Cl_2 (**XVIII, LXIV, LXXVIII, LXXXVI**);

R' =  (**LXXI–LXXVIII**),

 (**LXXIX–LXXXVI**).

Phenoxyacetic acids XI–XVIII. An appropriate phenol (0.02 mol) and NaOH (1.64 g) was dissolved in water (6.56 ml), and the mixture thus obtained was added dropwise within 2 h while stirring to chloroacetic acid (1.57 g) at 110–120°C. On completing the addition the reaction mixture was stirred at 110–120°C for 1 h more. The mixture was cooled and carefully acidified with 2 N H_2SO_4 till slightly acidic reaction. The separated crystals were filtered off. We obtained the corresponding acids **XI–XVIII** in 77–92% yield. For acids **XI, XII, XVIII** the physical constants are consistent with the published data [6, 7]. Melting points of acids XIII–XVII are as follows, °C: (181–183), (179–181), (101–103), (data lacking), (195–198).

Esters XXIX–LVI. To a solution of alcohol **IV–X** (3 mmol) in anhydrous pyridine (5 ml) cooled to 10°C was added dropwise 10-undecenoyl, 3-methyl-2,4-decadienoyl, or 2,4-dichlorophenoxyacetyl chloride (3.1 mmol) dissolved in anhydrous ethyl ether (5 ml). The stirring at room temperature was continued for 2 h. The reaction mixture was diluted with ethyl ether, and the solution was washed in succession by 5% HCl, saturated NaCl solution, then dried with $MgSO_4$, and evaporated. The residue was subjected to column chromatography (SiO_2, eluent pentane–ether, 85 : 15). Thus were obtained the corresponding esters **XXIX–LVI**.

2-(Phenoxy)ethyl 10-undecenoate (XXIX). Yield 0.66 g (72%). IR spectrum (cm^{-1}): 760 s, 950 s, 1110 s, 1290 s, 1600 m, 1640 w, 1740 s, 3070 w. ^1H NMR spectrum (δ, ppm): 1.26–1.30 m (10H, CH_2), 1.45 m (2H, H_2C^3), 2.05 d.t (2H, HC^9, $J_{8,9}$ 7.0, $J_{9,10}$ 6.0 Hz), 2.34 t (2H, HC^2, J 7.5 Hz), 3.97 t (2H, CH_2O, J 5.0 Hz), 4.11 t (2H, CH_2OAr, J 5.0 Hz), 4.96 m (2H, HC^{11}), 5.80 m (1H, HC^{10}), 6.95 m and 7.27 m (5H, H_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 24.76 t (C^3), 28.95 t (C^4), 29.12 t (C^8), 29.33 t (C^5), 29.38 t (C^7), 29.79 t (C^6), 33.86 t (C^9), 34.26 t (C^2), 61.59 t (CH_2OAr), 69.11 t (CH_2O), 114.62 t (CH_2=), 114.68 d (C^4_{arom}), 121.23 d ($C^{2,6}_{arom}$), 129.61 d ($C^{3,5}_{arom}$), 139.26 d (CH=), 158.67 s (C^1_{arom}), 178.57 s (C=O). Found, %: C 75.18; H 9.11. $C_{19}H_{28}O_3$. Calculated, %: C 74.96; H 9.27.

2-(4-Chlorophenoxy)ethyl 10-undecenoate (XXX). Yield 0.79 g (79%). IR spectrum (cm^{-1}): 810 m, 835 m, 925 m, 1115 m, 1290 m, 1605 m, 1640 w, 1745 s, 3080 w. ^1H NMR spectrum (δ, ppm): 1.26–1.30 m (10H, CH_2), 1.58 s (2H, H_2C^3), 2.08 d.t (2H, HC^9, $J_{8,9}$ 7.0, $J_{9,10}$ 6.3 Hz), 2.32 t (2H, HC^2, J 7.5 Hz), 3.94 t (2H, CH_2O, J 5.0 Hz), 4.10 t (2H, CH_2OAr, J 5.0 Hz), 4.98 m (2H, HC^{11}), 5.80 m (1H, HC^{10}), 6.93 d and 8.06 d (4H, H_{arom}, J 8.5 Hz). ^{13}C NMR spectrum (δ_C, ppm): 24.89 t (C^3), 28.92 t (C^4), 29.18 t (C^8), 29.20 t (C^5), 29.54 t (C^7), 29.76 t (C^6), 34.02 t (C^9), 34.24 t (C^2), 62.21 t (CH_2OAr), 66.34 t (CH_2O), 114.61 t (CH_2=), 114.64 d ($C^{2,6}_{arom}$), 128.61 d ($C^{3,5}_{arom}$), 128.76 s (C^4_{arom}), 139.29 d (CH=), 157.49 s (C^1_{arom}), 176.92 s (C=O). Found, %: C 67.84; H 8.11; Cl 10.15. $C_{19}H_{27}ClO_3$. Calculated, %: C 67.34; H 8.03; Cl 10.46.

2-(4-Nitrophenoxy)ethyl 10-undecenoate (XXXI). Yield 0.88 g (84%). IR spectrum (cm^{-1}): 852 m, 856 m, 908 m, 1036 m, 1272 s, 1592 m, 1644 w, 1752 s, 3120 w. ^1H NMR spectrum (δ, ppm): 1.18–1.28 m (10H, CH_2), 1.54 m (2H, H_2C^3), 1.95 d.t (2H, HC^9, $J_{8,9}$ 7.0, $J_{9,10}$ 6.4 Hz), 2.27 t (2H, HC^2, J 7.5 Hz), 4.09 t (2H, CH_2O, J 5.0 Hz), 4.35 t (2H, CH_2OAr, J

5.0 Hz), 4.89 m (2H, CH_2=), 5.74 m (1H, HC^{10}), 6.89 m (2H, $H^{2,6}_{arom}$), 7.22 m (2H, $H^{3,4}_{arom}$). ^{13}C NMR spectrum(δ_C, ppm): 24.96 t (C^3), 28.95 t (C^4), 29.12 t (C^8), 29.24 t (C^5), 29.33 t (C^7), 29.77 t (C^6), 33.83 t (C^9), 34.24 t (C^2), 62.66 t (CH_2OAr), 65.95 t (CH_2O), 114.21 t (CH_2=), 114.67 d ($C^{2,6}_{arom}$), 121.21 d ($C^{3,5}_{arom}$), 139.23 d (HC^{10}=), 141.95 s (C^4_{arom}), 158.56 s (C^1_{arom}), 173.86 s (C=O). Found, %: C 65.48; H 7.56; N 4.18. $C_{19}H_{27}NO_5$. Calculated, %: C 65.31; H 7.79; N 4.01.

2-(3-Phenoxyphenoxy)ethyl 10-undecenoate (XXXII). Yield 0.82 g (69%). IR spectrum (cm^{-1}): 780 m, 875 m, 970 s, 1210 s, 1605 m, 1745 s, 3080 w. ^1H NMR spectrum (δ, ppm): 1.25–1.30 m (10H, CH_2), 1.50 m (2H, H_2C^3), 2.07 d.t (2H, HC^9, $J_{8,9}$ 7.0, $J_{9,10}$ 6.5 Hz), 2.33 t (2H, HC^2, *J* 7.0 Hz), 4.12 t (2H, CH_2O, *J* 5.0 Hz), 4.34 t (2H, CH_2OAr, *J* 5.0 Hz), 5.01 m (2H, HC^{11}), 5.80 m (1H, HC^{10}), 6.48 s (1H, H^2_{arom}), 6.53–6.59 m (3H, $H^{4,5,6}_{arom}$), 6.93–7.34 m (5H_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 24.93 t (C^3), 28.96 t (C^4), 29.12 t (C^8), 29.22 t (C^5), 29.33 t (C^7), 29.71 t (C^6), 33.83 t (C^9), 34.41 t (C^2), 63.41 t (CH_2OAr), 66.30 t (CH_2O), 101.97 d (C^2_{arom}), 107.38 d (C^6_{arom}), 112.08 d (C^4_{arom}), 114.10 t (CH_2=), 117.96 d ($C^{2',6'}_{arom}$), 120.32 d (C^4_{arom}), 129.60 d and 129.64 d (C^5_{arom} and $C^{3',5'}_{arom}$), 139.29 d (CH=), 156.76 s (C^3_{arom}), 158.73 s ($C^{1'}_{arom}$), 159.18 s (C^1_{arom}), 178.31 s (C=O). Found, %: C 75.51; H 8.04. $C_{25}H_{32}O_4$. Calculated, %: C 75.73; H 8.13.

2-(4-Phenoxyphenoxy)ethyl 10-undecenoate (XXXIII). Yield 0.76 g (64%). IR spectrum (cm^{-1}): 848 m, 854 m, 970 s, 1205 s, 1605 m, 1645 w, 1745 s, 3080 w. ^1H NMR spectrum(δ, ppm): 1.25–1.30 m (10H, CH_2), 1.51 m (2H, H_2C^3), 2.08 d.t (2H, HC^9, $J_{8,9}$ 7.0, $J_{9,10}$ 6.5 Hz), 2.33 t (2H, HC^2, *J* 7.0 Hz), 4.12 t (2H, CH_2O, *J* 5.0 Hz), 4.32 t (2H, CH_2OAr, *J* 5.0 Hz), 5.05 m (2H, HC^{11}), 5.78 m (1H, HC^{10}), 6.60–7.17 m (9H_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 24.93 t (C^3), 28.97 t (C^4), 29.14 t (C^8), 29.22 t (C^5), 29.33 t (C^7), 29.77 t (C^6), 33.76 t (C^9), 34.24 t (C^2), 63.44 t (CH_2OAr), 66.32 t (CH_2O), 114.15 t (CH_2=), 114.29 d ($C^{2,6}_{arom}$), 118.95 d, 119.05 d ($C^{3,5}_{arom}$ and $C^{2',6'}_{arom}$), 122.73 d ($C^{3',5'}_{arom}$), 129.6 d (C^4_{arom}), 139.26 (CH=), 150.72 s (C^4_{arom}), 154.29 (C^1_{arom}), 156.87 s (C^1_{arom}), 178.38 (C=O). Found, %: C 75.48; H 8.24. $C_{25}H_{32}O_4$. Calculated, %: C 75.73; H 8.13.

2-(2,3-Dimethylphenoxy)ethyl 10-undecenoate (XXXIV). Yield 0.81 g (81%). IR spectrum (cm^{-1}): 705 w, 765 m, 1090 m, 1130 s, 1205 s, 1595 s, 1760 s. ^1H NMR spectrum (δ, ppm): 1.25–1.30 m (10H, CH_2), 1.54 m (2H, H_2C^3), 2.04 d.t (2H, HC^9, $J_{8,9}$ 7.0, $J_{9,10}$ 6.5 Hz), 2.30 t (2H, HC^2, *J* 7.0 Hz), 2.34 s and 2.38 s (6H, CH_{3arom}), 4.18 t (2H, CH_2O, *J* 5.0 Hz), 4.27 t (2H, CH_2OAr, *J* 5.0 Hz), 4.98 m (2H, HC^{11}), 5.84 m (1H, HC^{10}), 6.67 d (1H, H^6_{arom}, *J* 8.0 Hz), 6.93 d (1H, H^4_{arom}, *J* 8.0 Hz), 7.07 m (1H, H^5_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 11.59 q ($CH_3C^2_{arom}$), 19.92 q ($CH_3C^3_{arom}$), 24.74 t (C^3), 28.96 t (C^4), 29.11 t (C^8), 29.33 t (C^5), 29.34 t (C^7), 29.76 t (C^6), 33.84 t (C^9), 34.28 t (C^2), 61.07 t (CH_2OAr), 65.89 t (CH_2O), 109.11 d (C^6_{arom}), 114.26 t (CH_2=), 121.35 s (C^2_{arom}), 122.94 d (C^4_{arom}), 125.65 d (C^5_{arom}), 137.90 s (C^3_{arom}), 139.25 d (CH=), 155.88 s (C^1_{arom}), 169.21 s (C=O). Found, %: C 75.87; H 9.48. $C_{21}H_{32}O_3$. Calculated, %: C 75.91; H 9.64.

2-(2,4-Dichlorophenoxy)ethyl 10-undecenoate (XXXV). Yield 0.95 g (85%). IR spectrum (cm^{-1}): 745 m, 830 m, 890 w, 1060 s, 1110 s, 1125 s, 1225 s, 1600 m, 1755 s, 3080 w. ^1H NMR spectrum (δ, ppm): 1.26–1.30 m (10H, CH_2), 1.55 m (2H, H_2C^3), 2.05 d.t (2H, HC^9, $J_{8,9}$ 7.0, $J_{9,10}$ 6.5 Hz), 2.33 t (2H, HC^2, *J* 7.0 Hz), 4.21 t (2H, CH_2O, *J* 5.0 Hz), 4.67 t (2H, CH_2OAr, *J* 5.0 Hz), 4.95 m (2H, HC^{11}), 5.84 m (1H, HC^{10}), 6.75 d (4H, H^6_{arom}, *J* 8.8 Hz), 7.01 d (1H, H^5_{arom}, *J* 8.8 Hz), 7.36 s (1H, H^3_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 24.74 t (C^3), 28.94 t (C^4), 29.15 t (C^8), 29.33 t (C^2), 29.38 t (C^7), 29.72 t (C^6), 33.81 t (C^9), 34.18 t (C^2), 61.58 t (CH_2OAr), 66.32 t (CH_2O), 114.28 t (CH_2=), 114.65 d (C^6_{arom}), 124.10 s (C^2_{arom}), 126.92 s (C^4_{arom}), 127.53 d (C^5_{arom}), 130.24 d (C^3_{arom}), 139.27 d (CH=), 152.37 s (C^1_{arom}), 169.81 (C=O). Found, %: C 61.46; H 7.18; Cl 19.01. $C_{19}H_{26}Cl_2O_3$. Calculated, %: C 61.13; H 7.02; Cl 18.99.

2-(Phenoxy)ethyl 3-methyl-2ξ,4*E*-decadienoate (XXXVI). Yield 0.76 g (84%). IR spectrum (cm^{-1}): 740 m, 760 w, 1250 s, 1380 s, 1600 m, 1640 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.28 m (6H, CH_2), 1.95 d (*Z*) and 2.26 d (*E*) (3H, CH_3C=C, *J* 1.5 Hz), 2.44 t (2H, H_2C^6, *J* 7.5 Hz), 3.97 t (2H, CH_2O, *J* 5.0 Hz), 4.25 t (2H, CH_2OAr, *J* 5.0 Hz), 5.70 br.s (1H, HC^2), 6.12 m [HC^4 (2*E*) and HC^5], 6.35 m and 7.24 m (5H, Ar), 7.32 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.16 q and 14.35 q (CH_3), 23.94 t (C^9), 30.80 t and 30.84 t (C^7 and C^8), 33.16 t (C^6), 63.56 t (CH_2OAr), 66.18 t (CH_2O), 114.64 d (C^4_{arom}), 121.18 d ($C^{2,6}_{arom}$), 124.80 d (C^2), 129.54 d ($C^{3,5}_{arom}$), 131.44 d (C^4), 138.96 d (C^5), 151.59 s (C^3), 158.34 s (C^1_{arom}), 166.32 s (C=0). Found, %: C

75.91; H 8.16. $C_{19}H_{26}O_3$. Calculated, %: C 75.46; H 8.67.

2-(4-Chlorophenoxy)ethyl 3-methyl-2ξ,4*E*-decadienoate (XXXVII). Yield 0.89 g (88%). IR spectrum (cm^{-1}): 815 m, 835 m, 1120 s, 1290 s, 1605 m, 1640 m, 1725 s, 3050 w. ^{1}H NMR spectrum (δ, ppm): 0.87 t (3H, CH_3, *J* 6.0 Hz), 1.26–1.29 m (6H, CH_2), 2.05 d (*Z*) and 2.28 d (*E*) (3H, CH_3C=C, *J* 1.5 Hz), 2.39 t (2H, H_2C^6, *J* 7.5 Hz), 4.04 t (2H, CH_2O, *J* 5.0 Hz), 4.18 t (2H, CH_2OAr, *J* 5.0 Hz), 5.68 br.s (1H, HC^2), 6.14 m [HC^4 (2*E*) and HC^5], 6.93 d and 7.94 d (4H, H_{arom}, *J* 8.5 Hz), 7.30 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.24 q and 14.36 q (CH_3), 23.92 t (C^9), 30.76 t and 30.81 t (C^7 and C^8), 33.14 (C^6), 61.98 t (CH_2OAr), 66.30 t (CH_2O), 114.85 d ($C^{2,6}_{arom}$), 124.6l d (C^2), 128.59 d ($C^{3,5}_{arom}$), 128.76 s (C^4_{arom}), 131.45 d (C^4), 138.85 d (C^5), 151.64 s (C^3), 157.52 s (C^1_{arom}), 166.55 s (C=O). Found, %: C 67.18; H 7.64; Cl 10.04. $C_{19}H_{25}O_3Cl$. Calculated, %: C 67.75; H 7.48; Cl 10.52.

2-(4-Nitrophenoxy)ethyl 3-methyl-2ξ,4*E*-decadienoate (XXXVIII). Yield 0.96 g (92%). IR spectrum (cm^{-1}): 740 m, 852 m, 856 m, 908 m, 1034 m, 1270 s, 1594 m, 1645 m, 1722 s, 3080 w. ^{1}H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.28 m (6H, CH_2), 2.08 d (*Z*) and 2.26 d (*E*) (3H, CH_3= C, *J* 1.5 Hz), 2.38 t (2H, H_2C^6, *J* 7.5 Hz), 4.04 t (2H, CH_2O, *J* 5.0 Hz), 4.36 t (2H, CH_2OAr, *J* 5.0 Hz), 5.64 br.s (1H, HC^2), 6.18 m [HC^4 (2*E*) and HC^5], 6.79 d (2H, $H^{2,6}_{arom}$), 7.28 m (2H, $H^{3,4}_{arom}$), 7.33 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.24 q and 14.35 q (CH_3), 23.87 t (C^9), 30.76 t and 30.84 t (C^7 and C^8), 33.18 t (C^6), 62.66 t (CH_2OAr), 65.95 t (CH_2O), 114.65 d ($C^{2,6}_{arom}$), 124.83 d (C^2), 121.21 d ($C^{3,5}_{arom}$), 132.08 d (C^4), 137.18 d (C^5), 141.98 s (C^4_{arom}), 151.66 s (C^3), 158.62 s (C^1_{arom}), 166.54 s (C=0). Found, %: C 65.18; H 7.41. $C_{19}H_{25}NO_5$. Calculated, %: C 65.69; H 7.25.

2-(3-Phenoxyphenoxy)ethyl 3-methyl-2ξ,4*E*-decadienoate (XXXIX). Yield 0.80 g (68%). IR spectrum (cm^{-1}): 740 m, 760 m, 848 m, 854 m, 970 s, 1205 s, 1605 m, 1640 m, 1725 s, 3080 m. ^{1}H NMR spectrum (δ, ppm): 0.88 t (3H, CH_3, *J* 6.0 Hz), 1.24–1.31 m (6H, CH_2), 1.99 d (*Z*) and 2.28 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.42 t (2H, H_2C^6, *J* 7.5 Hz), 4.18 t (2H, CH_2O, *J* 5.0 Hz), 4.39 t (2H, CH_2OAr, *J* 5.0 Hz), 5.67 br.s (1H, HC^2), 6.28 m [HC^4 (2*E*) and HC^5], 6.78–7.25 m ($9H_{arom}$), 7.31 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.18 q and 14.24 q (CH_3), 23.87 t (C^9), 30.46 t and 30.79 t (C^7 and C^8), 33.15 t (C^6), 63.44 t (CH_2OAr), 66.38 t (CH_2O), 102.15 d (C^2_{arom}), 107.44 d (C^6_{arom}), 112.04 d (C^4_{arom}), 117.87 d ($C^{2',6'}_{arom}$), 120.36 d (C^4_{arom}), 124.81 d (C^2), 129.66 d and 129.68 d (C^5_{arom} and $C^{3',5'}_{arom}$), 131.61 d (C^4), 138.88 d (C^5), 151.65 s (C^3), 156.68 s (C^3_{arom}), 158.71 s (C^1_{arom}), 159.32 s (C^1_{arom}), 166.38 s (C=O). Found, %: C 73.43; H 8.56. $C_{25}H_{30}O_4$. Calculated, %: C 73.71; H 8.44.

2-(4-Phenoxyphenoxy)ethyl 3-methyl-2ξ,4*E*-decadienoate (XL). Yield 0.69 g (59%). IR spectrum (cm^{-1}): 845 m, 850 m, 970 s, 1205 s, 1605 m, 1640 m, 1720 s, 3080 w. ^{1}H NMR spectrum (δ, ppm): 0.85 t (3H, CH_3, *J* 6.0 Hz), 1.24–1.31 m (6H, CH_2), 1.98 d (*Z*) and 2.28 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.42 t (2H, HC^6, *J* 7.5 Hz), 4.12 t (2H, CH_2O, *J* 5.0 Hz), 4.32 t (2H, CH_2OAr, *J* 5.0 Hz), 5.64 br.s (1H, HC^2), 6.28 m [2H, HC^4 (2*E*) and HC^5], 6.50–7.18 m ($9H_{arom}$), 7.25 d [HC^4 (2*Z*), *J* 12.0 Hz]. Found, %: C 75.54; H 8.28. $C_{25}H_{32}O_4$. Calculated, %: C 75.73; H 8.13.

2-(2,3-Dimethylphenoxy)ethyl 3-methyl-2ξ,4*E*-decadienoate (XLI). Yield 0.86 g (87%). IR spectrum (cm^{-1}): 705 w, 765 m, 1095 m, 1130 s, 1205 s, 1595 m, 1645 m, 1725 s, 3080 w. ^{1}H NMR spectrum (δ, ppm): 0.88 t (3H, CH_3, *J* 6.0 Hz), 1.25–1.38 m (6H, CH_2), 2.05 d (*Z*) and 2.28 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.34 s and 2.38 s (6H, CH_{3arom}), 2.45 t (2H, HC^6, *J* 7.5 Hz), 4.15 t (2H, CH_2O, *J* 5.0 Hz), 4.28 t (2H, CH_2OAr, *J* 5.0 Hz), 5.68 br.s (1H, HC^2), 6.24 m [HC^4 (2*E*) and HC^5], 6.67 d (1H, H^5_{arom}, *J* 8.0 Hz), 6.98 d (1H, H^4_{arom}, *J* 8.0 Hz), 7.05 m (1H, H^5_{arom}), 7.25 d [HC^4 (2*E*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 11.58 q (CH_3C^2), 14.18 q and 14.25 q (CH_3), 19.89 q ($CH_3C^3_{arom}$), 23.85 t (C^9), 30.44 t and 30.72 t (C^7 and C^8), 33.18 t (C^6), 61.10 t (CH_2OAr), 65.85 t (CH_2O), 109.11 d (C^6_{arom}), 121.35 s (C^2_{arom}), 122.96 d (C^4_{arom}), 124.85 d (C^2), 125.65 d (C^5_{arom}), 131.60 d (C^4), 137.85 d (C^3_{arom}), 138.90 d (C^5), 151.65 s (C^3), 155.88 s (C^1_{arom}), 166.39 (C=O). Found, %: C 76.48; H 9.12. $C_{21}H_{30}O_3$. Calculated, %: C 76.33; H 9.15.

2-(2,4-Dichlorophenoxy)ethyl 3-methyl-2ξ,4*E*-decadienoate (XLII). Yield 0.88 g (79%). IR spectrum (cm^{-1}): 745 m, 830 m, 905 w, 1065 m, 1225 s, 1600 m, 1640 m, 1720 s, 3080 w. ^{1}H NMR spectrum (δ, ppm): 0.88 t (3H, CH_3, *J* 6.0 Hz), 1.25–1.34 m (6H, CH_2), 1.98 d (*Z*) and 2.28 d (*E*) (3H, CH_3C=C, *J* 1.5 Hz), 2.45 t (2H, HC^6, *J* 7.5 Hz), 4.24 t (2H,

CH_2O, *J* 5.0 Hz), 4.64 t (2H, CH_2OAr, *J* 5.0 Hz), 5.61 br.s (1H, HC^2), 6.18 m [HC^4 (2*E*) and HC^5], 6.75 d (1H, H^6_{arom}, *J* 8.8 Hz), 7.05 d (1H, H^5_{arom}, *J* 8.8 Hz), 7.24 d [HC^4 (2*E*), *J* 12.0 Hz], 7.35 s (1H, HC^3_{arom}). ^{13}C NMR spectrum (δ, ppm): 14.18 q and 14.21 q (CH_3), 23.86 t (C^9), 30.42 t and 30.64 t (C^7 and C^8), 33.24 t (C^6), 61.57 t (CH_2OAr), 66.18 t (CH_2OCO), 114.66 d (C^6_{arom}), 124.10 s (C^2_{arom}), 124.83 d (C^2), 126.87 s (C^4_{arom}), 127.53 d (C^5_{arom}), 130.22 d (C^3_{arom}), 131.68 d (C^4), 138.88 d (C^5), 151.64 s (C^3), 152.36 s (C^1_{arom}), 167.85 s (C=O). Found, %: C 61.84; H 6.42; Cl 19.28. $C_{19}H_{24}ClO_3$. Calculated, %: C 61.46; H 6.52; Cl 19.04.

2-(Phenoxy)ethyl 3-methyl-2ξ,4*E*-undecadienoate (XLIII). Yield 0.72 g (75%). IR spectrum (cm^{-1}): 740 m, 760 w, 1260 s, 1380 s, 1600 m, 1640 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.26 m (8H, CH_2), 2.05 d (*Z*) and 2.22 d (*E*) (3H, CH_3C=C, *J* 1.5 Hz), 2.38 t (2H, H_2C^6, *J* 7.5 Hz), 3.95 t (2H, CH_2O, *J* 5.0 Hz), 4.18 t (2H, CH_2OAr, *J* 5.0 Hz), 5.68 br.s (1H, HC^2), 6.17 m [HC^4 (2*E*) and HC^5], 6.92 m and 7.25 m (5H, Ar), 7.30 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.05 q and 14.18 q (CH_3), 23.01 t (C^{10}), 26.46 t, 29.84 t and 30.68 t (C^9, C^8 and C^7), 33.12 t (C^6), 63.54 t (CH_2OAr), 66.17 t (CH_2OCO), 114.64 d (C^4_{arom}), 121.16 d ($C^{2,6}_{arom}$), 124.82 d (C^2), 129.50 d ($C^{3,5}_{arom}$), 130.44 d (C^4), 139.96 d (C^5), 152.62 s (C^3), 158.34 s (C^1_{arom}), 166.41 s (C=O). Found, %: C 76.18; H 8.76. $C_{20}H_{28}O_3$. Calculated, %: C 75.91; H 8.92.

2-(4-Chlorophenoxy)ethyl 3-methyl-2ξ,4*E*-undecadienoate (XLIV).Yield 0.72 g (68%). IR spectrum (cm^{-1}): 815 m, 830 m, 1125 s, 1290 s, 1605 m, 1640 m, 1720 s, 3050 w. ^1H NMR spectrum (δ, ppm): 0.88 t (3H, CH_3, *J* 6.0 Hz), 1.25–1.32 m (8H, CH_2), 2.08 d (*Z*) and 2.21 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.35 t (2H, H_2C^6, *J* 7.0 Hz), 4.06 t (2H, CH_2O, *J* 5.0 Hz), 4.28 t (2H, CH_2OAr, *J* 5.0 Hz), 5.56 br.s (1H, HC^2), 6.12 m [HC^4 (2*E*) and HC^5], 6.92 d and 7.94 d (4H, H_{arom}, *J* 8.5 Hz), 7.28 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.01 q and 14.21 q (CH_3), 22.99 t (C^{10}), 29.46 t, 29.83 t and 30.68 t (C^9, C^8 and C^7), 33.14 t (C^6), 63.54 t (CH_2OAr), 66.18 t (CH_2OCO), 114.64 s (C^4_{arom}), 121.18 d ($C^{2,6}_{arom}$), 124.81 d (C^2), 129.48 d ($C^{3,5}_{arom}$), 130.45 d (C^4), 139.87 d (C^5), 152.62 s (C^3), 158.38 s (C^1_{arom}), 165.98 s (C=O). Found, %: C 68.84; H 7.43; Cl 10.61. $C_{20}H_{27}ClO_3$. Calculated, %: C 68.46; H 7.76; Cl 10.10.

2-(4-Nitrophenoxy)ethyl 3-methyl-2ξ,4*E*-undecadienoate (XLV). Yield 0.9 g (83%). IR spectrum (cm^{-1}): 740 m, 852 m, 856 m, 910 m, 1030 m, 1250 s, 1600 m, 1645 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.85 t (3H, CH_3, *J* 6.0 Hz), 1.25–1.32 m (8H, CH_2), 2.02 d (*Z*) and 2.18 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.24 t (2H, H_2C^6, *J* 7.5 Hz), 4.04 t (2H, CH_2O, *J* 5.0 Hz), 4.38 t (2H, CH_2OAr, *J* 5.0 Hz), 5.62 br.s (1H, HC^2), 6.15 m [HC^4 (2*E*) and HC^5], 7.02 d ($H^{2,6}_{arom}$, *J* 8.0 Hz), 7.24 m (2H, $H^{3,4}_{arom}$), 7.25 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.25 q and 14.32 q (CH_3), 22.94 t (C^{10}), 29.45 t, 29.85 t and 30.78 t (C^9, C^8 and C^7), 33.16 t (C^6), 63.55 t (CH_2OAr), 66.15 t (CH_2O), 114.65 d ($C^{2,6}_{arom}$), 121.25 d ($C^{3,5}_{arom}$), 124.80 d (C^2), 131.04 d (C^4), 139.86 d (C^5), 141.98 s (C^4_{arom}), 151.95 s (C^3), 158.42 (C^1_{arom}), 166.50 s (C=O). Found, %: C 66.41; H 7.28; N 3.46. $C_{20}H_{27}NO_5$. Calculated, %: C 66.46; H 7.53; N 3.88.

2-(3-Phenoxyphenoxy)ethyl 3-methyl-2ξ,4*E*-undecadienoate (XLVI). Yield 0.78 g (64%). IR spectrum (cm^{-1}): 740 m, 765 m, 848 m, 854 m, 965 s, 1205 s, 1600 m, 1645 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.85 t (3H, CH_3, *J* 6.0 Hz), 1.28 m (8H, CH_2), 2.04 d (*Z*) and 2.28 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.38 t (2H, H_2C^6, *J* 7.5 Hz), 4.18 t (2H, CH_2O, *J* 5.0 Hz), 4.34 t (2H, CH_2OAr, *J* 5.0 Hz), 5.66 br.s (1H, HC^2), 6.24 m [HC^4 (2*E*) and HC^5], 6.7–7.2 m ($9H_{arom}$), 7.28 d [HC^4 (2*Z*), *J* 12.0 Hz]. Found, %: C 76.18; H 7.56. $C_{26}H_{32}O_4$. Calculated, %: C 76.44, H 7.90.

2-(4-Phenoxyphenoxy)ethyl 3-methyl-2ξ,4*E*-undecadienoate (XLVII). Yield 0.71 g (58%). IR spectrum (cm^{-1}): 845 m, 850 m, 970 s, 1208 s, 1600 m, 1640 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.85 t (3H, CH_3, *J* 6.0 Hz), 1.28 m (8H, CH_2), 1.98 d (*Z*) and 2.26 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.36 t (2H, HC^6, *J* 7.5 Hz), 4.16 t (2H, CH_2O, *J* 5.0 Hz), 4.32 t (2H, CH_2OAr, *J* 5.0 Hz), 5.68 br.s (1H, HC^2), 6.25 m [HC^4 (2*E*) and HC^5], 6.5–7.2 m ($9H_{arom}$), 7.25 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.11 q and 14.16 q (CH_3), 23.04 t (C^{10}), 29.44 t, 29.86 t and 30.64 t (C^9, C^8 and C^7), 33.18 t (C^6), 63.44 t (CH_2OAr),

66.34 t (CH_2O), 114.28 d ($C^{2,6}_{arom}$), 118.92 d and 118.98 d ($C^{3,5}_{arom}$ and $C^{2',6'}_{arom}$), 122.73 d ($C^{3',5'}_{arom}$), 124.85 d (C^{2}), 129.56 d (C^{4}_{arom}), 130.34 d (C^{4}), 139.92 d (C^{5}), 150.62 s (C^{4}_{arom}), 152.62 s (C^{3}), 154.09 (C^{1}_{arom}), 156.85 s (C^{1}_{arom}), 166.49 s (C=O). Found, %: C 76.58; H 8.12. $C_{26}H_{32}O_4$. Calculated, %: C 76.44; H 7.90.

2-(2,3-Dimethylphenoxy)ethyl 3-methyl-2ξ,4*E*-undecadienoate (XLVIII). Yield 0.78 g (76%). IR spectrum (cm^{-1}): 705 w, 760 m, 1095 m, 1130 s, 1210 m, 1600 m, 1640 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.88 t (3H, CH_3, *J* 6.0 Hz), 1.25–1.32 m (8H, CH_2), 2.01 d (*Z*) and 2.28 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.28 s and 2.30 s (6H, CH_{3arom}), 2.34 t (2H, HC^6, *J* 7.5 Hz), 4.15 t (2H, CH_2O, *J* 5.0 Hz), 4.24 t (2H, CH_2OCO, *J* 5.0 Hz), 5.64 br.s (1H, H_2C), 6.28 m [HC^4 (2*E*) and HC^5], 6.67 d (1H, H^6_{arom}, *J* 8.0 Hz), 6.98 d (1H, H^4_{arom}, *J* 8.0 Hz), 7.05 m (H^5_{arom}), 7.25 d [1H, HC^4 (2*E*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 11.55 q ($CH_3C^2_{arom}$), 14.18 q and 14.22 q (CH_3), 19.82 q ($CH_3C^3_{arom}$), 23.08 t (C^{10}), 29.44 t, 29.88 t and 30.61 t (C^9, C^8 and C^7), 33.21 t (C^6), 61.08 t (CH_2OAr), 65.89 t (CH_2O), 109.24 d (C^6_{arom}), 122.84 (C^4_{arom}), 123.76 d (C^2_{arom}), 124.85 d (C^5), 125.68 d (C^5_{arom}), 131.59 d (C^4), 137.87 d (C^3_{arom}), 138.96 d (C^5), 151.62 s (C^3), 155.68 s (C^1_{arom}), 166.35 s (C=O). Found, %: C 76.81; H 9.22. $C_{22}H_{32}O_3$. Calculated, %: C 76.70; H 9.36.

2-(2,4-Dichlorophenoxy)ethyl 3-methyl-2ξ,4*E*-undecadienoate (XLIX). Yield 0.99 g (86%). IR spectrum (cm^{-1}): 815 m, 825 m, 1120 s, 1290 s, 1605 m, 1640 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.25–1.32 m (8H, CH_2), 2.01 d (*Z*) and 2.28 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.40 t (2H, HC^6, *J* 7.5 Hz), 4.21 t (2H, CH_2O, *J* 5.0 Hz), 4.63 t (2H, CH_2OAr, *J* 5.0 Hz), 5.66 br.s (1H, CH_2), 6.24 m [HC^4 (2*E*) and HC^5], 6.78 d (1H, H^6_{arom}, *J* 8.5 Hz), 7.06 d (1H, H^5_{arom}, *J* 8.5 Hz), 7.28 m [HC^4 (2*Z*), *J* 12.0 Hz], 7.36 s (1H, H^3_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 14.18 q and 14.24 q (CH_3), 23.08 t (C^{10}), 29.46 t, 29.74 t and 30.62 t (C^9, C^8 and C^7), 33.26 t (C^6), 61.57 t (CH_2OAr), 66.18 t (CH_2O), 114.66 d (C^6_{arom}), 124.15 s (C^2_{arom}), 124.81 d (C^2), 126.68 c (C^4_{arom}), 127.53 d (C^5_{arom}), 130.29 d (C^3_{arom}), 131.59 d (C^4), 138.92 d (C^5), 151.60 s (C^3), 152.06 s (C^1_{arom}), 167.84 s (C=O). Found, %: C 62.81; H 6.64; Cl 18.56. $C_{20}H_{26}Cl_2O_3$. Calculated, %: C 62.34; H 6.80.

2-(Phenoxy)ethyl (2,4-dichlorophenoxy)acetate (L). Yield 0.5 g (49%). IR spectrum (cm^{-1}): 745 m, 760 w, 1240 s, 1380 s, 1600 m, 1740 s. ^1H NMR spectrum (δ, ppm): 4.25 t (2H, CH_2O, *J* 5.5 Hz), 4.28 t (2H, CH_2OAr, *J* 5.5 Hz), 4.73 s (2H, CH_2), 6.90–7.34 m (8H, H_{arom}). Found, %: C 56.65; H 4.16; Cl 20.71. $C_{16}H_{14}Cl_2O_4$. Calculated, %: 56.33; H 4.45; Cl 20.78.

2-(4-Chlorophenoxy)ethyl (2,4-dichlorophenoxy)acetate (LI). Yield 0.5 g (53%). IR spectrum (cm^{-1}): 816 m, 830 m, 1120 s, 1290 s, 1605 m, 1725 s. ^1H NMR spectrum (δ, ppm): 4.24 t and 4.28 t (4H, CH_2O, *J* 5.5 Hz), 4.68 s (2H, CH_2), 6.78 d (C^6_{arom}), 6.92 d and 7.24 d (4H, H_{arom}, *J* 8.5 Hz), 7.06 d (C^5_{arom}), 7.41 s (C^3_{arom}). Found, %: C 5.32; H 3.18; Cl 28.76. $C_{16}H_{13}Cl_3O_4$. Calculated, %: C 51.16; H 3.49; Cl 28.31.

2-(4-Nitrophenoxy)ethyl (2,4-dichlorophenoxy)-acetate (LII). Yield 0.63 g (54%). IR spectrum (cm^{-1}): 850 m, 870 m, 1120 s, 1280 s, 1600 m, 1720 s. ^1H NMR spectrum (δ, ppm): 4.26 t and 4.39 t (4H, CH_2OCO and CH_2OAr, *J* 5.5 Hz), 4.65 s (CH_2), 6.81 d (C^6_{arom}), 7.02 d and 7.12 d (2H, $H^{2,6}_{arom}$ and C^5_{arom}), 7.22 d ($H^{3,5}_{arom}$), 7.35 s (C^3_{arom}). Found, %: C 49.18; H 3.41; Cl 18.74; N 3.48. $C_{16}H_{13}Cl_3NO_6$. Calculated, %: C 49.46; H 3.39; Cl 18.36; N 3.63.

2-(3-Phenoxyphenoxy)ethyl (2,4-dichlorophenoxy)acetate (LIII). Yield 0.62 g (48%). IR spectrum (cm^{-1}): 740 m, 760 m, 845 m, 860 m, 965 s, 1205 s, 1600 m, 1720 s, 3080 w. Found, %: C 61.24; H 4.02; Cl 17.01. $C_{22}H_{18}Cl_2O_5$. Calculated, %: C 60.99; H 4.19; Cl 16.36.

2-(4-Phenoxyphenoxy)ethyl (2,4-dichlorophenoxy)acetate (LIV). Yield 0.67 g (52%). IR spectrum (cm^{-1}): 845 m, 850 m, 970 s, 1210 s, 1600 m, 1720 s, 3080 w. Found, %: C 60.75; H 4.00; Cl 16.15. $C_{22}H_{18}Cl_2O_5$. Calculated, %: C 60.99; H 4.19; Cl 16.36.

2-(2,3-Dimethylphenoxy)ethyl (2,4-dichlorophenoxy)acetate (LV). Yield 0.71 g (64%). IR spectrum (cm^{-1}): 705 w, 765 m, 1200 s, 1600 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 2.32 s (6H, CH_{3arom}), 4.18 t and 4.24 t (CH_2OCO and CH_2OAr), 4.68 c (CH_2), 6.67 d, 6.80 d, 6.98 d, 7.10 d, 7.15 d, 7.36 d ($6H_{arom}$). Found, %: C 58.16; H 5.04; Cl 19.49. $C_{18}H_{18}Cl_2O_4$. Calculated, %: C 58.55; H 4.91; Cl 19.20.

2-(2,4-Dichlorophenoxy)ethyl (2,4-dichlorophenoxy)acetate (LVI). Yield 0.87 g (71%). IR spectrum (cm^{-1}): 815 m, 820 m, 1110 s, 1290 s, 1605 m, 1725 s, 3080 w. Found, %: C 46.41; H 3.18; Cl 34.11. $C_{16}H_{12}Cl_4O_4$. Calculated, %: C 46.86; H 2.95; Cl 36.58.

Esters of phenoxyacetic acids LXXI–LXXXVI. To an appropriate phenoxyacetyl chloride (2 mmol) in an anhydrous benzene (10 ml) was added a solution of an appropriate alcohol. The reaction mixture was stirred for 30 min, the solvent was distilled off, the residue was dissolved in dichloromethane. This solution was washed with a saturated $NaHCO_3$ solution, dried with $MgSO_4$, filtered, and evaporated. Thus were obtained the corresponding esters **LXXI–LXXXVI**.

Geranyl (2-nitrophenoxy)acetate (LXXI). Yield 0.55 g (83%). IR spectrum (cm^{-1}): 860 m, 890 m, 1594 m, 1640 m, 1735 s, 3080 w. ^1H NMR spectrum (δ, ppm): 1.65 s and 1.68 s (9H, CH_3), 1.90–2.19 m (4H, CH_2), 4.56 d (2H, CH_2O, *J* 6.0 Hz), 4.74 s (2H, CH_2OAr), 5.1–5.3 m (2H, HC=), 6.91 m (1H, H^4_{arom}), 7.33 d (1H, H^6_{arom}, *J* 7.5 Hz), 7.44 m (1H, H^5_{arom}), 7.94 d (1H, H^3_{arom}, *J* 8.0 Hz). ^{13}C NMR spectrum (δ_C, ppm): 17.18 q ($\underline{C}\underline{H}_3C^3$), 17.69 q and 24.22 q ($C^8$ and $\underline{C}\underline{H}_3C^7$), 29.73 t ($C^5$), 40.84 t ($C^4$), 53.18 t ($OCH_2$), 66.21 t ($OCH_2O$), 114.64 d ($C^6_{arom}$), 119.94 d ($C^2$), 121.40 d ($C^4_{arom}$), 123.80 d ($C^6$), 125.64 d ($C^3_{arom}$), 131.40 s ($C^7$), 133.06 d ($C^5_{arom}$), 136.30 s and 137.06 s (C^3 and C^2_{arom}), 153.26 s (C^1_{arom}), 170.68 s (C=O). Found, %: C 64.76; H 6.48; N 4.32. $C_{18}H_{23}NO_5$. Calculated, %: C 64.85; H 6.95; N 4.20.

Geranyl (4-nitrophenoxy)acetate (LXXII). Yield 0.61 g (92%). IR spectrum (cm^{-1}): 850 m, 855 m 908 m, 1250 s, 1600 m, 1640 m, 1750 s, 3080 w. ^1H NMR spectrum (δ, ppm): 1.65 s and 1.68 s (9H, CH_3), 1.90– 2.20 m (CH_2), 4.54 d (2H, CH_2O, *J* 6.0 Hz), 4.69 s (2H, CH_2OAr), 6.87 m (2H, $H^{2,6}_{arom}$), 7.24 m (2H, $H^{3,4}_{arom}$), 7.44 m (1H, H^5_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 17.07 q ($\underline{C}\underline{H}_3C^3$), 17.65 q and 25.06 q ($C^8$ and $\underline{C}\underline{H}_3C^7$), 28.96 t ($C^5$), 40.64 t ($C^4$), 53.06 t ($OCH_2$), 66.31 t ($OCH_2O$), 114.54 d ($C^{2,6}_{arom}$), 119.71 d ($C^2$), and 121.80 d ($C^{3,5}_{arom}$), 123.64 d ($C^6$), 131.92 s ($C^7$), 136.18 s ($C^3$), 141.91 s ($C^4$), 158.88 s ($C^1_{arom}$), 173.48 s (C=O). Found, %: C 64.71; H 6.99; N 4.44. $C_{18}H_{23}NO_5$. Calculated, %: C 64.85; H 6.95; N 4.20.

Geranyl (2,3-dimethylphenoxy)acetate (LXXIII). Yield 0.49 g (78%). IR spectrum (cm^{-1}): 860 m, 880 m, 910 m, 1245 s, 1605 m, 1640 m, 1735 s, 3080 w. ^1H NMR spectrum (δ, ppm): 1.62 m, 1.71 s (9H, CH_3), 1.80– 1.95 m (CH_2), 2.32 c and 2.36 c (6H, CH_{3arom}), 4.48 d (2H, CH_2O, *J* 6.0 Hz), 4.72 s (2H, CH_2OAr), 5.10–5.32 m (2H, HC=), 6.60 d (1H, H^6_{arom}, *J* 8.5 Hz), 6.80 m (2H, H^4_{arom} and H^5_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 14.59 q and 20.32 q (CH_{3arom}), 17.10 q ($\underline{C}\underline{H}_3C^3$), 17.48 q and 25.16 q ($C^8$ and $\underline{C}\underline{H}_3C^7$), 28.74 t ($C^5$), 40.36 t ($C^4$), 53.12 t ($OCH_2$), 66.34 t ($OCH_2O$), 114.56 d ($C^6_{arom}$), 120.02 d ($C^2$), 123.81 d ($C^6$), 124.18 s ($C^2_{arom}$), 127.18 d ($C^4_{arom}$), 127.60 d ($C^5_{arom}$), 130.41 s and 131.56 s (C^7 and C^3_{arom}), 136.15 s (C^3), 152.35 s (C^1_{arom}), 173.45 s (C=O). Found, %: C 75.68; H 9.04. $C_{20}H_{28}O_3$. Calculated, %: C 75.91; H 8.92.

Geranyl (2,6-dimethylphenoxy)acetate (LXXIV). Yield 0.48 g (76%). IR spectrum (cm^{-1}): 830 m, 860 m, 1150 s, 1240 s, 1605 m, 1650 m, 1725 s. ^1H NMR spectrum (δ, ppm): 1.64 m, 1.70 m (9H, CH_3), 1.82–1.94 m (4H, CH_2), 2.34 s and 2.38 s (6H, CH_{3arom}), 4.46 d (2H, CH_2O, *J* 6.0 Hz), 4.76 s (2H, CH_2OAr), 5.10–5.30 m (2H, HC=), 6.60–7.10 m (3H, Ar). ^{13}C NMR spectrum (δ_C, ppm): 14.59 ($\underline{C}\underline{H}_3C^2_{arom}$), 16.56 q ($\underline{C}\underline{H}_3C^3$), 17.31 q, 20.64 q and 24.16 q ($\underline{C}\underline{H}_3C^7$, C^8 and $\underline{C}\underline{H}_3C^4_{arom}$), 28.36 t ($C^5$), 39.65 t ($C^4$), 55.01 t ($OCH_2$), 66.60 t ($OCH_2O$), 114.54 d ($C^6_{arom}$), 119.91 d ($C^2$), 123.64 d ($C^6$), 126.98 d ($C^3_{arom}$), 128.43 s and 132.44 s (C^2_{arom} and C^4_{arom}), 131.55 d (C^5_{arom}), 132.18 s (C^7), 136.25 s (C^3), 155.16 s (C^1_{arom}), 171.41 s (C=O). Found, %: C 75.71; H 9.05. $C_{20}H_{28}O_3$. Calculated, %: C 75.91; H 8.92.

Geranyl (2,5-dinitrophenoxy)acetate (LXXV). Yield 0.69 g (91%). IR spectrum (cm^{-1}): 835 m, 850 m, 1145 s, 1250 s, 1595 m, 1645 m, 1720 s. ^1H NMR spectrum (δ, ppm): 1.65 s and 1.70 m (9H, CH_3), 1.85–2.00 m (4H, CH_2), 4.45 d (2H, CH_2O, *J* 6.0 Hz), 4.74 s (2H, CH_2OAr), 5.10–5.25 m (2H, HC=), 6.80– 7.30 m (3H, Ar). Found, %: C 57.44; H 5.67; N 7.71. $C_{18}H_{22}N_2O_7$. Calculated, %: C 57.14; H 5.86; N 7.40.

Geranyl (3,4-dinitrophenoxy)acetate (LXXVI). Yield 0.67 g (89%). IR spectrum (cm^{-1}): 820 m, 870 m, 1140 s, 1245 s, 1600 m, 1645 m, 1725 s. ^1H NMR spectrum (δ, ppm): 1.64 s and 1.72 s (9H, CH_3), 1.75–1.95 m (4H, CH_2), 4.38 d (2H, CH_2O, *J* 6.0 Hz), 4.65 s (2H, CH_2OAr), 5.10–5.25 m (2H, HC=), 7.29 d (1H, H^6_{arom}, *J* 8.0 Hz), 7.55 s (1H, H^2_{arom}), 7.88 d (1H, H^5_{arom}, *J* 8.0 Hz). ^{13}C NMR spectrum (δ_C, ppm): 16.94 q ($\underline{C}\underline{H}_3C^3$), 17.30 q, 24.48 q ($\underline{C}\underline{H}_3C^7$ and C^8), 28.34 t (C^5), 40.18 t (C^4), 55.91 t (OCH_2), 66.44 t (OCH_2O), 110.12 d (C^2_{arom}), 119.86 and 119.91 d (C^2 and C^6_{arom}), 123.58 d (C^6), 128.48 d (C^5_{arom}), 132.18 s (C^7), 135.08 s and 136.28 s (C^5_{arom} and C^3), 144.01 s (C^5_{arom}), 159.29 s (C^1_{arom}), 171.38 s (C=O). Found, %: C 57.38; H 5.71; N 7.61. $C_{18}H_{22}N_2O_7$. Calculated, %: C 57.14; H 5.86; N 7.40.

Geranyl (2,3-dichlorophenoxy)acetate (LXXVII). Yield 0.56 g (78%). IR spectrum (cm^{-1}): 560 m, 840 m, 870 m, 1120 s, 1240 s, 1610 m, 1640 m, 1725 s. ^1H NMR spectrum (δ, ppm): 1.65 s and 1.72 m (9H, CH_3), 1.80–2.00 m (4H, CH_2), 4.52 d (2H, CH_2O, *J* 6.0 Hz), 4.68 s (2H, CH_2OAr), 5.12 d (1H, HC^6, *J* 6.0 Hz), 5.35 t (1H, HC^2, *J* 6.0 Hz), 6.83 d (1H, H^6_{arom}, *J* 7.5 Hz), 7.04 d (1H, H^4_{arom}, *J* 8.0 Hz), 7.18 m (1H, H^5_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 16.87 q ($\underline{C}H_3C^3$), 17.48 q (C^8), 24.18 q ($\underline{C}H_3C^7$), 26.94 t (C^5), 39.86 t (C^4), 56.98 t (OCH_2), 66.60 t (OCH_2O), 112.78 d (C^6_{arom}), 119.86 (C^2), 123.64 d (C^6), 124.18 d (C^4_{arom}), 124.63 s (C^2_{arom}), 129.18 d (C^5_{arom}), 131.83 s and 131.96 s (C^3_{arom} and C^7), 136.40 s (C^3), 154.96 s (C^1_{arom}), 168.63 s (C=O). Found, %: C 60.81; H 6.20; Cl 19.63. $C_{18}H_{22}Cl_2O_3$. Calculated, %: C 60.51; H 6.16; Cl 19.88.

Geranyl (2,4-dichlorophenoxy)acetate (LXXVIII). Yield 0.57 g (80%). IR spectrum (cm^{-1}): 545 m, 870 m, 890 m, 1120 s, 1240 s, 1605 m, 1640 m, 1720 s. ^1H NMR spectrum (δ, ppm): 1.64 s and 1.72 m (9H, CH_3), 1.80–2.20 m (4H, CH_2), 4.54 d (2H, CH_2O, *J* 6.0 Hz), 4.66 s (2H, CH_2OAr), 5.15 d (1H, HC^6, *J* 6.0 Hz), 5.30 t (1H, HC^2, *J* 6.0 Hz), 6.75 d (1H, H^6_{arom}, *J* 8.5 Hz), 7.03 d (1H, H^5_{arom}, *J* 8.5 Hz), 7.36 s (1H, H^3_{arom}). ^{13}C NMR spectrum (δ_C, ppm): 16.85 q ($\underline{C}H_3C^3$), 17.52 q (C^8), 24.18 q ($\underline{C}H_3C^7$), 27.03 t (C^5), 40.02 t (C^4), 56.89 t (OCH_2), 66.57 t (OCH_2O), 114.65 d (C^6_{arom}), 119.85 d (C^2), 123.61 d (C^6), 124.18 d (C^4_{arom}), 124.63 s (C^2_{arom}), 129.18 d (C^5_{arom}), 131.83 s and 131.96 s (C^3_{arom} and C^7), 136.40 s (C^3), 154.96 s (C^1_{arom}), 168.63 s (C=O). Found, %: C 60.81; H 6.20; Cl 19.63. $C_{18}H_{22}Cl_2O_3$. Calculated, %: C 60.51; H 6.16; Cl 19.88.

3-Methyl-2ξ,4*E*-decadienyl (2-nitrophenoxy)acetate (LXIX). Yield 0.58 g (83%). IR spectrum (cm^{-1}): 780 m, 850 m, 865 m, 908 m, 1050 m, 1250 s, 1595 m, 1645 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.25 m (6H, CH_2), 2.08 d (*Z*) and 2.26 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.34 m (2H, H_2C^6), 4.56 d (2H, CH_2O, *J* 6.0 Hz), 4.68 s (2H, CH_2OAr), 5.60 t (1H, HC^2, *J* 6.0 Hz), 6.15 m [HC^4 (2*E*) and HC^5], 6.90 m (1H, H^4_{arom}), 7.33 m [2H, H^6_{arom} and HC^4 (2*Z*), *J* 12.0 Hz], 7.45 m (1H, H^5_{arom}), 7.90 d (1H, H^3_{arom}, *J* 8.0 Hz). ^{13}C NMR spectrum (δ_C, ppm): 14.24 q and 14.34 q (CH_3), 23.86 t (C^9), 30.76 t and 30.86 t (C^7 and C^8), 33.21 t (C^6), 55.17 t (OCH_2), 66.22 t (OCH_2O), 114.64 d (C^6_{arom}), 124.40 d (C^4_{arom}), 124.83 d (C^2), 125.68 d (C^3_{arom}), 132.08 d (C^4), 133.10 d (C^5_{arom}), 137.07 s (C^2_{arom}), 137.27 d (C^5), 151.63 s (C^3), 154.48 s (C^1_{arom}), 170.66 s (C=O). Found, %: C 65.39; H 7.42; N 4.56. $C_{19}H_{25}NO_5$. Calculated, %: C 65.69; H 7.25; N 4.03.

3-Methyl-2ξ,4*E*-decadienyl (4-nitrophenoxy)acetate (LXXX). Yield 0.64 g (91%). IR spectrum (cm^{-1}): 730 m, 870 m, 1070 s, 1250 s, 1595 m, 1645 m, 1720 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.87 t (3H, CH_3, *J* 6.0 Hz), 1.26 m (6H, CH_2), 2.11 d (*Z*) and 2.28 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.34 m (2H, H_2C^6), 4.50 d (2H, CH_2O, *J* 6.0 Hz), 4.59 s (2H, CH_2OAr), 5.62 t (1H, HC^2, *J* 6.0 Hz), 6.18 m [HC^4 (2*E*) and HC^5], 6.85 m (2H, $H^{2,6}_{arom}$), 7.32 m (2H, $H^{3,4}_{arom}$), 7.28 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.24 q and 14.33 q (CH_3), 23.84 t (C^9), 30.73 t and 30.81 t (C^7 and C^8), 33.01 t (C^6), 55.04 t (OCH_2), 66.22 t (OCH_2O), 114.64 d ($C^{2,6}_{arom}$), 121.30 d ($C^{3,5}_{arom}$), 121.80 d (C^3_{arom}), 124.81 d (C^2), 132.08 d (C^4), 137.23 d (C^5), 151.46 s (C^3), 154.51 s (C^1_{arom}), 170.64 s (C=O). Found, %: C 65.44; H 7.31; N 4.34. $C_{19}H_{25}NO_5$. Calculated, %: C 65.69; H 7.25; N 4.03.

3-Methyl-2ξ,4*E*-decadienyl (2,3-dimethylphenoxy)acetate (LXXXI). Yield 0.52 g (79%). IR spectrum (cm^{-1}): 760 m, 880 m, 1110 s, 1240 s, 1600 m, 1645 m, 1725 s, 3080 w. ^1H NMR spectrum (δ, ppm): 0.85 t (3H, CH_3, *J* 6.0 Hz), 1.29 n (6H, CH_2), 2.09 d (*Z*) and 2.24 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.34 n and 2.38 s (8H, H_2C^6, H_3C_{arom}), 4.48 d (2H, CH_2O, *J* 6.0 Hz), 4.61 s (2H, CH_2OAr), 5.60 t (1H, HC^2, *J* 6.0 Hz), 6.15 m [HC^4 (2*E*) and HC^5], 6.67 d (1H, H^6_{arom}, *J* 8.0 Hz), 6.93 m (1H, H^4_{arom}, *J* 8.0 Hz), 7.08 m (1H, H^5_{arom}), 7.28 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.24 q, 14.31 q, 14.59 q and 20.32 q (CH_3), 23.67 t (C^9), 30.68 t and 30.92 t (C^7 and C^8), 33.15 t (C^6), 55.22 t (OCH_2), 66.22 t (OCH_2O), 114.55 d (C^6_{arom}), 124.15 d (C^2_{arom}), 124.83 d (C^2), 127.18 d (C^4_{arom}), 127.59 d (C^5_{arom}), 131.82 s (C^4_{arom}), 132.08 d (C^4), 137.25 d (C^5), 151.65 s (C^3), 154.32 s (C^1_{arom}), 170.68 s (C=O). Found, %: C 76.48; H 9.03. $C_{21}H_{30}O_3$. Calculated, %: C 76.33; H 9.15.

3-Methyl-2ξ,4*E*-decadienyl (2,6-dimethylphenoxy)acetate (LXXXII). Yield 0.5 g (76%). IR spectrum (cm^{-1}): 740 m, 860 m, 1110 s, 1250 s, 1600 m, 1645 m, 1720 ss 3080 w. ^1H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.28 m (6H, CH_2), 2.08 d (*Z*) and 2.24 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.34 m and 2.36 s (8H, H_2C^6, H_3C_{arom}), 4.46 d (2H, CH_2O, *J* 6.0 Hz), 4.65 c (2H, CH_2OAr), 5.60 t (1H, HC^2, *J* 6.0 Hz), 6.14 m [HC^4 (2*E*) and

HC^5], 6.75 d (1H, H^6_{arom}, *J* 8.5 Hz), 7.03 d (1H, H^5_{arom}, *J* 8.5 Hz), 7.25 d [HC^4 (2*Z*), *J* 12.0 Hz], 7.36 s (1H, H^3_{arom}, *J* 8.5 Hz). Found, %: C 76.58; H 9.18. $C_{21}H_{30}O_3$. Calculated, %: C 76.33; H 9.15.

3-methyl-2ξ,4E-decadienyl (2,5-dinitrophenoxy)acetate (LXXXIII). Yield 0.71 g (90%). IR spectrum (cm^{-1}): 835 m, 850 m, 1150 s, 1250 s, 1595 m, 1645 m, 1720 s. ^1H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.28 m (6H, CH_2), 2.06 d (*Z*) and 2.26 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.34 t (2H, H_2C^6, *J* 7.5 Hz), 4.55 d (2H, CH_2O, *J* 6.0 Hz), 4.73 s (2H, CH_2OAr), 5.50 t (1H, HC^2, *J* 6.0 Hz), 6.12 m [HC^4 (2*E*) and HC^5], 6.87–7.41 m [H^6_{arom} and HC^4 (2*Z*)]. Found, %: C 58.49; H 6.13; N 7.63. $C_{19}H_{24}N_2O_7$. Calculated, %: C 58.16; H 6.16; N 7.14.

3-methyl-2ξ,4E-decadienyl (3,4-dinitrophenoxy)-acetate (LXXXIV). Yield 0.69 g (87%). IR spectrum (cm^{-1}): 840 m, 850 m, 1140 s, 1220 s, 1600 m, 1640 m, 1725 s. ^1H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.23–1.28 m (6H, CH_2), 2.06 d (*Z*) and 2.25 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.34 m (2H, H_2C^6), 4.44 d (2H, CH_2O, *J* 6.0 Hz), 4.66 s (2H, CH_2OAr), 5.58 t (1H, HC^2, *J* 6.0 Hz), 6.18 m [HC^4 (2*E*) and HC^5], 7.19 d (1H, H^6_{arom}, *J* 8.0 Hz), 7.28 d [HC^4 (2*Z*), *J* 12.0 Hz], 7.58 s (1H, H^2_{arom}), 7.86 d (1H, H^5_{arom}, *J* 8.0 Hz). ^{13}C NMR spectrum (δ_C, ppm): 14.22 q and 14.28 q (CH_3), 23.68 t (C^9), 30.69 t and 30.91 t (C^7 and C^8), 33.26 t (C^6), 55.43 t (OCH_2), 66.44 t (OCH_2O), 110.14 d (C^2_{arom}), 119.81 d (C^6_{arom}), 124.83 d (C^2), 128.45 d (C^5_{arom}), 132.11 d (C^4), 136.28 s (C^4_{arom}), 137.24 d (C^5), 144.08 s (C^3_{arom}), 151.63 s (C^3), 159.29 s (C^1_{arom}), 171.35 s (C=O). Found, %: C 57.96; H 6.21; N 7.02. $C_{19}H_{24}N_2O_7$. Calculated, %: C 58.16; H 6.16; N 7.14.

3-Methyl-2ξ,4*E*-decadienyl (2,3-dichlorophenoxy)acetate (LXXXV). Yield 0.58 g (78%). IR spectrum (cm^{-1}): 560 m, 845 m, 870 m, 1120 s, 1240 s, 1600 m, 1640 w, 1725 s. ^1H NMR spectrum (δ, ppm): 0.87 t (3H, CH_3, *J* 6.0 Hz), 1.28 m (6H, CH_2), 2.08 d (*Z*) and 2.22 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.36 m (2H, H_2C^6), 4.42 d (2H, CH_2O, *J* 6.0 Hz), 4.66 s (2H, CH_2OAr), 5.60 t (1H, HC^2, *J* 6.0 Hz), 6.18 m [HC^4 (2*E*) and HC^5], 6.83 d (1H, H^6_{arom}, *J* 8.0 Hz), 7.04 d (1H, H^4_{arom}, *J* 8.0 Hz), 7.18 m (1H, H^5_{arom}), 7.28 d [HC^4 (2*Z*), *J* 12.0 Hz]. ^{13}C NMR spectrum (δ_C, ppm): 14.21 q and 14.32 q (CH_3), 23.72 t (C^9), 30.49 t and 30.86 t (C^7 and C^8), 33.31 t (C^6), 55.82 t (OCH_2), 66.51 t (OCH_2O), 112.79 d (C^6_{arom}), 124.52 s (C^2_{arom}), 124.83 m (C^2 and C^4_{arom}), 129.18 d (C^5_{arom}), 131.83 s (C^3_{arom}), 132.11 d (C^4), 137.31 d (C^5), 151.62 s (C^3), 154.93 s (C^1_{arom}), 169.18 s (C=O). Found, %: C 61.41; H 6.72; Cl 19.18. $C_{19}H_{24}Cl_2O_3$. Calculated, %: C 61.46; H 6.52; Cl 19.10.

3-Methyl-2ξ,4*E*-decadienyl (2,4-dichlorophenoxy)acetate (LXXXVI). Yield 0.68 g (91%). IR spectrum (cm^{-1}): 540 m, 845 m, 870 m, 1250 s, 1695 m, 1725 s. ^1H NMR spectrum (δ, ppm): 0.86 t (3H, CH_3, *J* 6.0 Hz), 1.28 m (6H, CH_2), 2.07 d (*Z*) and 2.28 d (*E*) (3H, CH_3C= C, *J* 1.5 Hz), 2.34 m (2H, H_2C^6), 4.48 d (2H, CH_2O, *J* 6.0 Hz), 4.71 s (2H, CH_2OAr), 5.58 t (1H, HC^2, *J* 6.0 Hz), 6.15 m [HC^4 (2*E*) and HC^5], 6.74 d (1H, H^6_{arom}, *J* 8.5 Hz), 7.03 d (1H, H^5_{arom}, *J* 8.5 Hz), 7.28–7.38 m [H^5_{arom} and HC^4 (2*Z*)]. ^{13}C NMR spectrum (δ_C, ppm): 14.24 q and 14.32 q (CH_3), 23.71 t (C^9), 30.46 t and 30.81 t (C^7 and C^8), 33.34 t (C^6), 55.81 t (OCH_2), 66.51 t (OCH_2O), 114.65 d (C^6_{arom}), 124.06 s (C^2_{arom}), 124.83 m (C^2), 126.83 s (C^4_{arom}), 127.51 d (C^5_{arom}), 130.23 d (C^3_{arom}), 132.12 d (C^4), 137.34 d (C^5), 151.62 s (C^3), 154.57 s (C^1_{arom}), 169.18 s (C=O). Found, %: C 61.54; H 6.49; Cl 19.32. $C_{19}H_{24}Cl_2O_3$. Calculated, %: C 61.46; H 6.52; Cl 19.10.

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